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ABSTRACT

A project was conducted to develop and validate criterion-referenced test items for the following vocational education programs: child care worker, machine shop, electronics, drafting, and automobile mechanics. For each of the programs, the following activities took place: a project coordinator was assigned, subject-area instructors and a test construction expert were selected to participate in the test item development workshop, existing material was identified, a test item development workshop was conducted, tests were submitted for validation by test-construction experts, suggested changes were incorporated and field tested at various sites within Missouri, additional revisions accommodated field test results, and copies and computer disks of the tests were prepared for use during an inservice meeting of the Missouri Vocational Association. The tests are suitable for use by secondary schools, vocational-technical schools, junior colleges, and other institutions of higher and special education. The materials are expected to be used in more than 400 Missouri school districts. (Appendixes, which make up more than half the document, include the following: agenda for the machine shop criterion-referenced test development workshop; information on writing test items, including suggestions for using the cognitive, affective, and psychomotor domains; a matrix for linking objectives to test items, advantages and disadvantages of various types of test items; rules for writing true-false, matching, and multiple-choice items, and performance checklists; and steps in writing test items and checklists for Vocational Instructional Management Systems competencies.) (KC)

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# FINAL REPORT

## Criterion-Referenced Test Items for Vocational Education

(RFP 91-133-110-4)

Harley Schlichting, Project Director
University of Missouri-Columbia
Columbia, MO 65211

June 30, 1991

Missouri Department of Elementary and Secondary Education
Vocational Planning and Evaluation Unit
Jefferson City, MO 65102

CE 062 317

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## ABSTRACT


| | |
|---|---|
| Title: | Criterion-Referenced Test Items for Vocational Education (RFP 91-133-110-4) |
| Principal Investigator: | Harley Schlichting, Director, Instructional Materials Laboratory |
| Institution: | University of Missouri-Columbia |
| Location: | Columbia, MO 65211 |
| Phone: | 314/882-2884 |
| Starting/Ending Dates: | July 1, 1990, June 30, 1991 |

**Objectives of the Project**

To develop and validate criterion-referenced test items for the following vocational education programs:

1. Child Care Worker
2. Machine Shop
3. Electronics
4. Drafting
5. Auto Mechanics

**A Brief Description of the Project**

The number of copies prescribed in the Request for Proposals for each curriculum module will accompany this report to the Division of Vocational and Adult Education, Vocational Planning and Evaluation Section, by the scheduled completion date.

**Impact Statement**

Materials developed as a result of this project will be used by vocational educators in nearly 400 Missouri school districts, thus reaching thousands of vocational students throughout the state.


## OBJECTIVES

**Home Economics Education - Child Care Worker**

The overall purpose of this proposal was to develop and validate one (1) test item for each competency/performance objective currently identified for the Missouri Child Care Worker, Phase II. Achieving this goal required the completion of specific objectives.

1. Conduct a workshop to develop one (1) test item for each performance objective, composed of six (6) occupational child care instructors, representatives from the Department of Elementary and Secondary Education, and a test construction specialist for guidance, critique, evaluation, and instruction in writing test items in the cognitive, affective, and psychomotor domains. Review and revise criterion-referenced test items.
2. Validate test items by developing an instrument to evaluate content and construction for the writers and other select occupational child care instructors.
3. Revise and finalize test items, based on evaluation critiques.
4. Deliver eight (8) copies of the final items along with (4) copies of the final report to the Vocational Planning and Evaluation Unit. A copy of the final product and report will be submitted to the Vocational Planning and Evaluation Section for review and approval before being reproduced.
5. Provide inservice training to home economics educators/teachers through regional workshops and state vocational inservice conferences.

**Trade and Technical - Machine Shop**

The general objective of this proposal was to develop criterion-referenced test items for the Missouri machine shop competency profile. The test items could be adopted for use in either the VAMS program or the COMPVIMS/Project Basic III program. Successful completion of this general objective depended upon the completion of the following specific objectives.

1. Assign a coordinator for the project.
2. Select machine shop instructors and a test-construction expert to participate in the test-item development workshop.
3. Identify existing material (i.e., test banks or references) that may be useful in developing the test items.
4. Conduct the test-item development workshop. The three-day workshop would consist of the following persons: machine shop instructors; a test-construction expert; and representatives of DESE Industrial Education Section.
5. Prepare the test items for validation by the test-construction expert; submit items for validation.
6. Incorporate changes suggested by the test-construction expert.
7. Select five field test sites, each in a different geographic location within Missouri.
8. Orientate the field testers via teleconference. Field test the items.
9. Conduct a meeting of field testers to evaluate items.
10. Revise items according to the results of the field test.

11. Deliver two copies of the completed test-item booklets and computer disks to DESE Industrial Education staff and three copies to the Division of Vocational and Adult Education, Vocational Planning and Evaluation.
12. Provide 33 booklets and computer disks to DESE Industrial Education staff to train machine shop instructors in test-item use during an in-service meeting at the 1991 Missouri Vocational Association Summer Conference.

**Trade and Technical - Electronics**

The general objective of this proposal was to develop criterion-referenced test items for the Missouri electronics competency profile. The test items could be adopted for use in either the VAMS program or the COMPVIMS/Project Basic III program. Successful completion of this general objective depended upon the completion of the following specific objectives.

1. Assign a coordinator for the project.
2. Select electronics instructors and a test-construction expert to participate in the test-item development workshop.
3. Identify existing material (i.e., test banks or references) that may be useful in developing the test items.
4. Conduct the test-item development workshop. The three-day workshop would consist of the following persons: electronics instructors; a test-construction expert; and representatives of DESE Industrial Education Section. (Refer to Appendix 1)
5. Prepare the test items for validation by the test-construction expert; submit items for validation.
6. Incorporate changes suggested by the test-construction expert.
7. Select five field test sites, each in a different geographic location within Missouri.
8. Orientate the field testers via teleconference. Field test the items.
9. Conduct a meeting of field testers to evaluate items.
10. Revise items according to the results of the field test.
11. Deliver two copies of the completed test-item booklets and computer disks to DESE Industrial Education staff and three copies of the completed test-item booklets and computer disks to the Division of Vocational and Adult Education, Vocational Planning and Evaluation.
12. Provide 53 booklets and computer disks to DESE Industrial Education staff to train electronics instructors in test-item use during an in-service meeting at the 1991 Missouri Vocational Association Summer Conference.

**Trade and Technical - Drafting**

The general objective of this proposal was to develop criterion-referenced test items for the Missouri drafting competency profile. The test items could be adopted for use in either the VAMS program or the COMPVIMS/Project Basic III program. Successful completion of this general objective depended upon the completion of the following specific objectives.

1. Assign a coordinator for the project.
2. Select drafting instructors and a test-construction expert to participate in the test-item development workshop.
3. Identify existing material (i.e., test banks or references) that may be useful in developing the test items.
4. Conduct the test-item development workshop. The three-day workshop would consist of the following persons: drafting instructors; a test-construction expert; and representatives of DESE Industrial Education Section.
5. Prepare the test items for validation by the test-construction expert; submit items for validation.
6. Incorporate changes suggested by the test-construction expert.
7. Select five field test sites, each in a different geographic location within Missouri.
8. Orientate the field testers via teleconference. Field test the items.
9. Conduct a meeting of field testers to evaluate items.
10. Revise items according to the results of the field test.
11. Deliver two copies of the completed test-item booklets and computer disks to DESE Industrial Education staff and three copies of the completed test-item booklets and computer disks to the Division of Vocational and Adult Education, Vocational Planning and Evaluation.
12. Provide 33 booklets and computer disks to DESE Industrial Education staff to train drafting instructors in test-item use during an in-service meeting at the 1991 Missouri Vocational Association Summer Conference.

**Trade and Technical - Auto Mechanics**

The general objective of this proposal was to develop criterion-referenced test items for the Missouri auto mechanics competency profile. The test items could be used in either the VAMS program or the COMPVIMS/Project Basic III program. Successful completion of this general objective depended upon the completion of the following specific objectives.

1. Assign a coordinator for the project.
2. Select auto mechanics instructors and a test-construction expert to participate in the test item development workshop.

3. Identify existing material (i.e. test banks or references) that may be useful in developing the test items.
4. Conduct the test item development workshop. The three-day workshop would consist of the following persons: auto mechanics instructors; a test-construction expert; and representatives of the DESE Industrial Education Section.
5. Prepare the test items for validation by the test-construction expert; submit the items to the test-construction expert for review.
6. Incorporate changes suggested by the test-construction expert.
7. Select five field test sites, each in a different geographic location within Missouri.
8. Orientate the field testers; field test the items.
9. Conduct a meeting of field testers to evaluate items.
10. Revise items according to the results of the field test.
11. Print copies of the test items to be disseminated at the 1991 Missouri Vocational Association Summer Conference.
12. Deliver two copies of the completed test-item booklets and computer disks to DESE Industrial Education staff and two copies of the completed test-item booklets and computer disks to the Division of Vocational and Adult Education, Vocational Planning and Evaluation.
12. Train auto mechanics instructors in the use of the test item bank and disseminate the bank during an in-service meeting at the 1991 Missouri Vocational Association Summer Conference.

## POPULATION AND SAMPLE

Our cost-recovery materials are developed for all areas of vocational education for use by secondary schools, vocational-technical schools, junior colleges, and other institutions of higher and special education. Our fieldtesting and advisory committee assistance is drawn from the personnel involved in these educational institutions and industry representatives.

## CONCLUSIONS AND RECOMMENDATIONS

After the vocational educational curriculum priorities were determined, curriculum materials were developed under the direction of selected PAVTE faculty members and DESE personnel with the assistance of IML staff. Committees of local teachers, administrators, and business and industry representatives from the state were involved in setting curriculum development priorities and in identifying content for the curriculum resources developed. All of the guides in this report have undergone this developmental process.

## DISCLAIMER

The following disclaimer was shown on all curriculum disseminated as a result of this project: "The activity which is the subject of this report was supported in whole or in part by funds from the Department of Elementary and Secondary Education, Division of Vocational and Adult Education. However, the opinions expressed herein do not necessarily reflect the position or policies of the Missouri Department of Elementary and Secondary Education or the Division of Vocational and Adult Education, and no official endorsement should be inferred."

# *Machine Shop*
# *Criterion-Referenced Test (CRT) Workshop*
*Chancellor IV (lower level), Days Inn*

**Mon., Aug. 6, 1990**

| | |
|---|---|
| 8:30-9:15 a.m. | *Welcome and introductions*<br>Diane Davis and Phyllis Miller<br>Instructional Materials Laboratory, MU<br><br>*Opening remarks and project overview*<br>Judith Moore, supervisor<br>Industrial Education, DESE |
| 9:15-11:30 | *Introduction to test item development*<br>Charles Oviatt<br>Educational consultant |
| 11:30-12:30 | Lunch (Chancellor VI) |
| 12:30-5 p.m. | *Division of competencies among writers*<br>*Review of existing test items for possible inclusion*<br>--IML guide<br>--Apprentice Machinist<br>--Other sources |

**Tues., Aug. 7**

| | |
|---|---|
| 8:30-11:30 a.m. | Write test items |
| 11:30-12:30 | Lunch (Chancellor VI) |
| 12:30-5 p.m. | Discuss field-test sites and meeting(s)<br>Progress review and continuation of test item development |

**Wed., Aug. 8**

| | |
|---|---|
| 8:30-11:30 a.m. | Continuation of test item development |
| 11:30-12:30 | Lunch (Chancellor VI) |
| 12:30-4 p.m. | Conclusion of test item development |
| 4-5 | Wrap-up; expense voucher completion |

# Writing Test Items

**Presenter:**
**Charles D. Oviatt, Ph.D.**

**Instructional Materials Laboratory**

## AGENDA FOR ORIENTATION SESSION

1. Domains and levels of learning

2. Linking competencies to item types

| Computer-scored | Manually scored |
|---|---|
| True-false | Performance checklist |
| Matching | |
| Multiple-choice | |

3. Advantages and disadvantages of item types

4. Writing items for VIMS competencies

5. Practice/feedback

## WORKSHOP OBJECTIVE

Upon completion of this workshop, participants will have used educational measurement principles to create test items and checklists for the competencies (tasks) of the Vocational Instructional Management System (VIMS). Participants will write at least four computer-scorable test items for each competency.

# COGNITIVE DOMAIN

| Descriptions of the Major Categories in the Cognitive Domain | Illustrative General Instructional Objectives | Illustrative Verbs for Stating Specific Learning Outcomes |
|---|---|---|
| 1. **Knowledge.** Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain. | Knows common terms<br>Knows specific facts<br>Knows methods and procedures<br>Knows basic concepts<br>Knows principles | Defines, describes, identifies, labels, lists, matches, names, outlines, reproduces, selects, states |
| 2. **Comprehension.** Comprehension is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words or numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding. | Understands facts and principles<br>Interprets verbal material<br>Interprets charts and graphs<br>Translates verbal material to mathematical formulas<br>Estimates consequences implied in data<br>Justifies methods and procedures | Converts, defends, distinguishes, estimates, explains, extends, generalizes, gives examples, infers, paraphrases, predicts, rewrites, summarizes |
| 3. **Application.** Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws, and theories. Learning outcomes in this area require a higher level of understanding than those under comprehension. | Applies principles to new situations<br>Applies theories to practical situations<br>Solves mathematical problems<br>Constructs charts and graphs<br>Demonstrates correct usage of a procedure | Changes, computes, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses |
| 4. **Analysis.** Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material. | Recognizes unstated assumptions<br>Recognizes logical fallacies in reasoning<br>Distinguishes between facts and inferences<br>Evaluates the relevancy of data<br>Analyzes the organizational structure of a work (art, music, writing) | Breaks down, diagrams, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, points out, relates, selects, separates, subdivides |
| 5. **Synthesis.** Synthesis refers to the ability to put parts together to form a new whole. This may involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of *new* patterns or structures. | Writes a well-organized theme<br>Gives a well-organized speech<br>Writes a creative short story (or poem)<br>Proposes a plan for an experiment<br>Integrates learning from different areas into a plan for solving a problem<br>Formulates a new scheme for classifying objects (or events, or ideas) | Categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes |
| 6. **Evaluation.** Evaluation is concerned with the ability to judge the value of material (statement, novel, poem, research report) for a given purpose. The judgments are to be based on definite criteria. These may be internal criteria (organization) or external criteria (relevance to the purpose) and the student may determine the criteria or be given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all of the other categories, plus value judgments based on clearly defined criteria. | Judges the consistency of written material<br>Judges the adequacy with which conclusions are supported by data<br>Judges the value of a work (art, music, writing) by use of internal criteria<br>Judges the value of a work (art, music, writing) by use of external standards | Appraises, compares, concludes, contrasts, criticizes, describes, discriminates, explains, justifies, interprets, relates, summarizes, supports |



**Major Categories in the Cognitive Domain of the Taxonomy of Educational Objectives (Bloom 1956)**



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# AFFECTIVE DOMAIN

| Descriptions of the Major Categories in the Affective Domain | Illustrative General Instructional Objectives | Illustrative Verbs for Stating Specific Learning Outcomes |
|---|---|---|
| 1. **Receiving.** Receiving refers to the student's willingness to attend to particular phenomena or stimuli (classroom activities, textbook, music, etc.). From a teaching standpoint, it is concerned with getting, holding, and directing the student's attention. Learning outcomes in this area range from the simple awareness that a thing exists to selective attention on the part of the learner. Receiving represents the lowest level of learning outcomes in the affective domain. | Listens attentively<br>Shows awareness of the importance of learning<br>Shows sensitivity to social problems<br>Accepts differences of race and culture<br>Attends closely to the classroom activities | Asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits erect, replies, uses |
| 2. **Responding.** Responding refers to active participation on the part of the student. At this level he not only attends to a particular phenomenon but also reacts to it in some way. Learning outcomes in this area may emphasize acquiescence in responding (reads assigned material), willingness to respond (voluntarily reads beyond assignment), or satisfaction in responding (reads for pleasure or enjoyment). The higher levels of this category include those instructional objectives that are commonly classified under *interest*; that is, those that stress the seeking out and enjoyment of particular activities. | Completes assigned homework<br>Obeys school rules<br>Participates in class discussion<br>Completes laboratory work<br>Volunteers for special tasks<br>Shows interest in subject<br>Enjoys helping others | Answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes |
| 3. **Valuing.** Valuing is concerned with the worth or value a student attaches to a particular object, phenomenon, or behavior. This ranges in degree from the more simple acceptance of a value (desires to improve group skills) to the more complex level of commitment (assumes responsibility for the effective functioning of the group). Valuing is based on the internalization of a set of specified values, but clues to these values are expressed in the student's overt behavior. Learning outcomes in this area are concerned with behavior that is consistent and stable enough to make the value clearly identifiable. Instructional objectives that are commonly classified under *attitudes* and *appreciation* would fall into this category. | Demonstrates belief in the democratic process<br>Appreciates good literature (art or music)<br>Appreciates the role of science (or other subjects) in everyday life<br>Shows concern for the welfare of others<br>Demonstrates problem-solving attitude<br>Demonstrates commitment to social improvement | Completes, describes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works |
| 4. **Organization.** Organization is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system. Thus the emphasis is on comparing, relating, and synthesizing values. Learning outcomes may be concerned with the conceptualization of a value (recognizes the responsibility of each individual for improving human relations) or with the organization of a value system (develops a vocational plan that satisfies his need for both economic security and social service). Instructional objectives relating to the development of a philosphy of life would fall into this category. | Recognizes the need for balance between freedom and responsibility in a democracy<br>Recognizes the role of systematic planning in solving problems<br>Accepts responsibility for own behavior<br>Understands and accepts own strengths and limitations<br>Formulates a life plan in harmony with his abilities, interests, and beliefs | Adheres, alters, arranges, combines, compares, completes, defends, explains, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes |
| 5. **Characterization by a Value or Value Complex.** At this level of the affective domain, the individual has a value system that has controlled his behavior for a sufficiently long time for him to have developed a characteristic *life style*. Thus the behavior is pervasive, consistent, and predictable. Learning outcomes at this level cover a broad range of activities, but the major emphasis is on the fact that the behavior is typical or characteristic of the student. Instructional objectives that are concerned with the student's general patterns of adjustment (personal, social, emotional) would be appropriate here. | Displays safety consciousness<br>Demonstrates self-reliance in working independently<br>Practices cooperation in group activities<br>Uses objective approach in problem solving<br>Demonstrates industry and self-discipline<br>Maintains good health habits | Acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, uses, verifies |





**Major Categories in the Affective Domain of the Taxonomy of Educational Objectives (Bloom 1956)**

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Appendix 1 (cont.)

# PSYCHOMOTOR DOMAIN

| Description of the Major Categories in the Psychomotor Domain | Illustrative General Instructional Objectives | Illustrative Verbs for Stating Specific Learning Outcomes |
|---|---|---|
| 1. **Perception.** The first level is concerned with the use of the sense organs to obtain cues that guide motor activity. This category ranges from sensory stimulation (awareness of a stimulus), through cue selection (selecting task-relevant cues), to translation (relating cue perception to action in a performance). | Recognizes malfunction by sound of machine<br>Relates taste of food to need for seasoning<br>Relates music to a particular dance step | Chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects, separates |
| 2. **Set.** Set refers to readiness to take a particular type of action. This category includes mental set (mental readiness to act), physical set (physical readiness to act), and emotional set (willingness to act). Perception of cues serves as an important prerequisite for this level. | Knows sequence of steps in varnishing wood<br>Demonstrates proper bodily stance for batting a ball<br>Shows desire to type efficiently | Begins, displays, explains, moves, proceeds, reacts, responds, shows, starts, volunteers |
| 3. **Guided Response.** Guided response is concerned with the early stages in learning a complex skill. It includes imitation (repeating an act demonstrated by the instructor) and trial and error (using a multiple-response approach to identify an appropriate response). Adequacy of performance is judged by an instructor or by a suitable set of criteria. | Performs a golf swing as demonstrated<br>Applies first aid bandage as demonstrated<br>Determines best sequence for preparing a meal | Assembles, builds, calibrates, constructs, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends mixes, organizes, sketches |
| 4. **Mechanism.** Mechanism is concerned with performance acts where the learned responses have become habitual and the movements can be performed with some confidence and proficiency. Learning outcomes at this level are concerned with performance skills of various types, but the movement patterns are less complex than at the next higher level. | Writes smoothly and legibly<br>Sets up laboratory equipment<br>Operates a slide projector<br>Demonstrates a simple dance step | (Same list as for Guided Response) |
| 5. **Complex Overt Response.** Complex overt response is concerned with the skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, smooth, accurate performance, requiring a minimum of energy. This category includes resolution of uncertainty (performs without hesitation) and automatic performance (movements are made with ease and good muscle control). Learning outcomes at this level include highly coordinated motor activities. | Operates a power saw skillfully<br>Demonstrates correct form in swimming<br>Demonstrates skill in driving an automobile<br>Performs skillfully on the violin<br>Repairs electronic equipment quickly and accurately | (Same list as for Guided Response) |
| 6. **Adaptation.** Adaptation is concerned with skills that are so well developed that the individual can modify movement patterns to fit special requirements or to meet a problem situation. | Adjusts tennis play to counteract opponent's style<br>Modifies swimming strokes to fit the roughness of the water | Adapts, alters, changes, rearranges, reorganizes, revises, varies |
| 7. **Origination.** Origination refers to the creating of new movement patterns to fit a particular situation or specific problem. Learning outcomes at this level emphasize creativity based upon highly developed skills. | Creates a dance step<br>Creates a musical composition<br>Designs a new dress style | Arranges, combines, composes, constructs, creates, designs, originates |

**A Classification of Educational Objectives in the Psychomotor Domain (Simpson 1972)**





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LINKING OBJECTIVES TO ITEM TYPES

| Level of cognitive learning | Knowledge and comprehension | | Higher-order skills | |
|---|---|---|---|---|
| Typical learning outcomes | List, name, describe, identify, explain, state, define, cite examples | | Predict, use, compute, read, determine, differentiate | |
| Performance which should be called for by item | Supply (recall) | Select (recognition) | Supply | Select |
| Type of item to use | Completion | True-false<br>Multiple-choice<br>Matching | Essay<br>Checklist | Multiple-choice |
| Scoring procedures | Objective | Objective | Subjective | Objective |

ADVANTAGES/DISADVANTAGES OF ITEM TYPES

| | ADVANTAGES | DISADVANTAGES |
|---|---|---|
| TRUE-FALSE | cover ↑ content<br>easy to write<br>easy to score | emphasis on memory<br>dependence on absolute judgments<br>↑ guessing factor |
| MATCHING | easy to write<br>measures assocs.<br>↓ guessing factor | emphasis on memory<br>scanned answer sheets accommodate 5 opts. |
| MULTIPLE-CHOICE | versatile<br>cover ↑ content<br>easy to score<br>↓ guessing factor<br>useful for instruction | time consuming to write, esp. for high levels |
| COMPLETION | easy to write<br>↓ guessing factor<br>cover ↑ content | scoring can be difficult<br>emphasis on memory |
| RESTRICTED-RESPONSE ESSAY | easy to write<br>measures expression & organization<br>↓ guessing factor | time consuming to score<br>subjective scoring<br>cover ↓ content |
| CHECKLIST | measures actual performance | subjective scoring<br>time consuming to develop and administer |

# THE TRUE-FALSE ITEM

The true-false (alternative response) item consists of a declarative statement that the examinee indicates is either true or false (right or wrong, correct or incorrect, etc.).

The true-false item is most commonly used to measure the ability to identify the correctness of facts, definitions of terms, statements of principles and the like. It can also be used to distinguish cause from effect or correct from incorrect procedures.

Because the true-false item has several limitations, especially that of being susceptible to guessing, it should be used sparingly.

## Rules for Writing True-False Items

DO:

1. explain method of marking (+/0, T/F, etc.)
2. construct statements that are definitely true or false
3. attribute an opinion to its source
4. write short statements
5. keep true and false statements equal in length
6. include more false items than true items (maybe 2/3 false; 1/3 true)

DON'T:

1. write double negative statements
2. give verbal clues (such as absolutes like "always" or "never")
3. order items according to some system that will give clues.
4. take statements directly from text
5. write complex statements with two complete parts
6. write general statements which need qualifications (or more information)
7. write items using second person ("you")

## THE MATCHING ITEM

Matching items consist of a set or list of descriptions (stimuli) and a set of options (responses) which are to be matched or associated.

Matching items are commonly used to measure factual information based on simple associations - for example, symbols and concepts or objects and labels.

The matching item can be used to measure objectives which emphasize the ability to identify the relationship between two things as long as a sufficient number of descriptions and options can be obtained.

### Rules for Writing Matching Items

DO:

1. write clear directions and indicate if options can be used more than once
2. keep the list of descriptions and the list of options short and homogeneous
3. title the lists and arrange in logical order
4. make sure all options are plausible
5. make descriptions the longer phrases; options shorter
6. number each description; letter each option
7. include more options than descriptions and include some options that don't match any descriptions

DON'T:

1. put any part of either list on different pages or let descriptions be separated from options.
2. exceed 7 or 8 descriptions

# THE MULTIPLE-CHOICE ITEM

A multiple-choice item consists of a problem and a list of suggested solutions. The problem may be stated as a direct question or as an incomplete statement. This is called the stem. The list of suggested solutions may include words, numbers, phrases, symbols, etc. which are called options, choices, or alternatives. The correct option is the answer and the remaining options are called distractors (or decoys or foils).

The multiple-choice item is the most versatile type of test item available. It can measure a variety of learning outcomes from simple to complex, and it is adaptable to any content area. It is typically used to measure knowledge of terminology, specific facts, principles, methods, procedures. and other types of higher order cognitive skills.

## Rules for Writing Multiple-Choice Items

DO:

1. formulate a clear problem in the stem
2. provide only one correct answer
3. make sure distractors are plausible
4. eliminate grammatical clues in stem ("a" or "an")
5. keep distractors of equal length
6. rotate position of correct answer
7. include 3 to 5 options
8. make options similar in terms of content
9. order options according to a logical system

DON'T:

1. use negatively-stated questions or statements excessively
2. use "none of the above" frequently
3. use "all of the above" frequently
4. use "a and b", "b, c, and d" etc. <u>at all</u>
5. use overlapping alternatives
6. repeat information/words occurring in stem in options
7. write items using second person ("you")

## THE PERFORMANCE CHECKLIST

Performance checklists contain a list of behaviors, traits, or characteristics that are either present or absent. Objectives that require a student to demonstrate psychomotor skills (e.g., procedures) can be effectively measured by performance checklists.

Constructing checklists requires a thorough analysis of the behaviors required to perform a procedure satisfactorily. Steps in constructing a VIMS checklist for a psychomotor performance objective include:

1. identifying the behavioral segments of the behavior (TASK) specified in the objective,

2. sequencing those behavioral segments correctly, and

3. putting the behavior analysis in the form of a checklist.

STEPS IN WRITING TEST ITEMS/CHECKLISTS FOR VIMS COMPETENCIES

1. Determine the domain and level of learning implied by the competency.

2. Select the appropriate item type with which to measure the competency, given the domain and level of learning.

3. Determine the content parameters specified in the competency.

4. Write at least four congruent computer-scorable items and, when appropriate, one congruent checklist for each competency.

**Remember: Congruence between the item and the competency is a function of level alignment and content match!**